

UTAH DIVISION OF WILDLIFE RESOURCES STATEWIDE MANAGEMENT PLAN FOR MULE DEER

I. PURPOSE OF THE PLAN

A. General

This document will provide overall guidance and direction for managing Utah's mule deer populations. This plan briefly describes general information on mule deer natural history, management, habitat, population status, and issues concerning mule deer management in Utah. This plan also outlines the goals, objectives, and strategies for managing mule deer populations and their habitats. The plan will be used to help set priorities for statewide mule deer management programs and provide guidance for individual unit management plans.

B. Dates Covered

This plan will be presented for approval in November 2008 and will be in effect for five years from the date of approval.

II. SPECIES ASSESSMENT

A. Natural History

Mule deer (*Odocoileus hemionus*) are part of the deer or cervid family along with moose, elk and caribou. A unique feature of the cervid family is that the males of the species grow boney antlers that are shed each year. The name "mule deer" comes from their large ears, which resemble those of mules. The specific epithet *hemionus* means half mule. Mule deer occur throughout the western U.S. with as many as 11 subspecies described (deVos, 2003).

Mule deer males, females and young are known as bucks, does, and fawns, respectively. Fawns are born as singles or more commonly as twins after a gestation period of approximately 7 months. Fawns are normally born in June with an average fawning date in Utah of June 20 (Robinette et. al., 1977). Fawns must grow rapidly to be large enough to survive Utah's cold, snowy winters.

The antlers of bucks begin to grow as soon as the old antlers are shed in late winter. Bucks will generally live apart from the does and fawns through the summer antler growing period (Geist, 1998). The velvet which covers and provides nourishment to the growing antlers begins to shed in early September. In Utah, the rut or breeding period for mule deer peaks in mid-November. During the rut, bucks seek out and "tend" several does, waiting for them to come into estrus. During the peak of estrus does are receptive for less than a day and sometimes for only a few hours. If not bred during the first estrous cycle, does will go through another cycle about 4 weeks later (Wallmo 1978).

After the rut, bucks become reclusive again until they shed their antlers in late winter when they join herds of does and fawns and blend in with the rest of the antlerless population. In late spring,

the does seek solitude for fawning. At this time, the yearlings from the previous year are aggressively driven away by the does and forced to find new home ranges sometimes many miles away. When new fawns are born the annual cycle begins again.

B. Management

1. UDWR Regulatory Authority

The Utah Division of Wildlife Resources operates under the authority granted by the Utah Legislature in Title 23 of the Utah Code. The Division was created and established as the wildlife authority for the state under section 23-14-1 of the Code. This Code also vests the Division with necessary functions, powers, duties, rights, and responsibilities associated with wildlife management within the state. Division duties are to protect, propagate, manage, conserve, and distribute protected wildlife throughout the state.

2. Past and Current Management

Mule deer were common in Utah at the time of settlement, although not as abundant as today (Rawley, 1985). Mule deer harvest was unrestricted until after the turn of the twentieth century. In 1908 the hunting season on deer was closed to help protect Utah's dwindling deer herd (Rawley 1980). In 1913 deer hunting resumed when the legislature enacted a buck only law which remained in effect until 1950. However, as the deer herd increased game managers realized the need for antlerless harvest in order to keep the deer herds in balance with their habitat. The first limited harvest of does began in 1934 on four separate herd units and multiple permits, multiple seasons, and extra permits for antlerless deer were common in the 1950s and early 1960s. Deer harvest peaked in Utah in 1961 when over 132,000 deer were harvested (Figure 1). As the number of hunters and permits increased, deer populations were gradually reduced and brought more in balance with available forage and habitat. Extra permits and antlerless harvest were gradually reduced through the mid 1960s and early 1970s.

By the mid 1970s it was apparent to managers that the deer herds were in decline and below the capacity of the habitat in many areas. In 1975, the state again adopted a statewide buck only hunting strategy and a symposium was held in 1976 to discuss the decline of mule deer in the west (Workman and Low, 1976). Under buck only hunting the deer herd went through a series of boom and bust cycles depending on annual production. The peak harvest of buck deer in the state occurred in 1983 when 82,552 bucks were harvested during the general season. Buck hunter numbers also peaked in 1983 with 228,907 hunters participating in the general season deer hunt, whereas the total number of hunters peaked in 1988 with nearly 250,000 total hunters afield (Figure 1).

Following several years of drought and an unusually hard winter in 1992–1993, it was evident that Utah's deer herd could no longer sustain unlimited hunting opportunity, and in 1994, buck deer permits were capped for the first time. A total of 97,000 general season buck permits, divided into five hunting regions, have been available each year since 1994. However, due to difficulties in monitoring over-the-counter permit sales, buck hunter numbers exceeded 97,000 permits in some years. Permit sales have been held closer to the 97,000 cap since going to a

drawing in 2000. Because of severe drought during the early 2000s, the permit cap was temporarily reduced to 95,000 in 2005 with 1000 permits being removed from both the Central and Northeastern regions.

The first statewide deer management plan was approved by the Board of Big Game Control in 1995. Individual management plans were then developed for 53 deer management units and approved by the Board in 1996. Unit management plans were revised in 1998 following a reduction in the number of deer units from 53 to 30. Unit management plans were again revised in 2001 to incorporate new objectives and habitat information. The 1995 statewide management plan remained in effect until 2003 when it was updated and approved by the Wildlife Board. Unit plans were last revised in 2006.

C. Habitat

Mule deer are adaptable to a wide variety of habitats throughout their range (Wallmo, 1981). In North America, they live from the northern boreal forests to the hot deserts of the southwest and from the coastal rain forests to the Great Plains. In Utah, mule deer are found in nearly all of the state although they are less abundant in the desert areas (Figure 3).

Although mule deer occur in a wide variety of habitat types, there are many similarities in diet and habitat composition. Deer eat a wide variety of plants including browse, forbs and grasses. Deer are especially reliant on shrubs for forage during critical winter months. Fawn production is closely tied to the abundance of succulent, green forage during the spring and summer months. Although vegetative communities vary throughout the range of mule deer; habitat is nearly always characterized by areas of thick brush or trees interspersed with small openings. The thick brush and trees are used for escape cover whereas the small openings provide forage and feeding areas.

Mule deer do best in habitats that are in the early stages of plant succession. The relationship is described in the WAFWA (2003) publication on mule deer which states: "Mule deer thrive in early successional habitats, where forbs, grassy plants and shrubs dominate. These environments are not as stable as forest habitats, and they rely on fire or some other type of disturbance to return them to an early successional stage. If they are not disturbed, they become more stable plant communities dominated by large trees and large shrubs. Tree-dominated habitats offer mule deer a place to retreat from severe weather, but these areas offer little in the way of food. That is why it is important to provide a mosaic or pattern of habitats that can provide food, cover and water".

One of the major problems facing mule deer populations in Utah is that many of the crucial deer ranges are in late successional plant community stages that are dominated by mature stands of pinion-juniper or other conifer trees and old even-aged stands of shrubs, such as sagebrush. Many crucial deer winter ranges are covered with older shrubs that are 30–40 years of age with little or no recruitment of young plants, or are being replaced by annual grasses, such as cheatgrass. Additionally, many forest aspen habitats are being replaced by conifers that provide little forage for mule deer. In order for mule deer herds to reach their population objectives in Utah, it is essential that extensive habitat treatments be completed to revert crucial sagebrush

habitats back to young, vigorous, shrub-dominated communities, and restore aspen communities to early seral stages.

D. Population Status

The 2007 post-season population estimate for mule deer in Utah was 302,000 deer, well below the long term management objective of 426,000 deer. The statewide deer herd slowly increased for several years after the disastrous winter of 1992-93. However, the herd decreased during 2000–2003 due to severe drought conditions (Figure 2).

In 2003, Utah was in the fifth year of an extended drought. Utah recorded the driest year on record and the hottest month on record (July) in 2002. The hottest month record was broken again in July of 2003. The result of extended drought conditions was poor fawn production and the degradation and loss to wildfire of many crucial winter ranges. In recent years, weather patterns have moderated in portions of the state and in those areas the deer herd has slowly increased in those areas.

III. ISSUES AND CONCERNS

A. Habitat

The size and condition of mule deer populations are primarily determined by the quantity and quality of their habitat. Deer habitats are classified into three main categories (winter, summer and transitional) based on season of use. A lack in quality and quantity of available winter range is often the most substantial factor limiting the growth of deer herds; however, summer and transitional ranges can also have significant affects on fawn production and overwinter survival. Loss and degradation of habitat are thought to be the main reasons for mule deer population declines over the last few decades (Workman and Low 1976, WAFWA 2003). Crucial mule deer habitat is continuously being lost in many parts of Utah and severely fragmented in others due to human population expansion, development, and natural events. Urbanization, road construction, OHV use, energy development, drought, catastrophic wildfire, and expansion of invasive plant species have all resulted in loss or degradation of mule deer habitat.

A boom in energy development in portions of Utah has already claimed and fragmented thousands of acres of mule deer habitat. Small, isolated disturbances within non-limiting habitats are of minor consequence within most ecosystems. However, larger-scale developments within limited habitat types are a major concern to managers because such impacts cannot be relieved or absorbed by surrounding, unaltered habitats (Watkins et al. 2007). Direct and indirect impacts associated with energy and mineral development have the potential to affect mule deer population dynamics, especially when impacts are concentrated on winter ranges or other limited habitats (Sawyer et al. 2002).

The quality of mule deer habitat is the major factor in determining herd size. Habitat quality for mule deer has declined in Utah over the past 40 years (Utah Big Game Range Trend Studies 2003–2007). Deer herds erupted in the 1940s and 1950s in response to abundant shrub growth on mule deer ranges throughout the state, as a result of overgrazing on most rangelands. Many

shrub-dominated rangelands have gradually been converting to juniper-dominated communities due to lack of fire or other disturbance. The conversion of shrublands to annual grasslands has also been accelerated in recent years due to drought, fire, invasive weed species, and other causes. Consequently, fawn production and deer populations have declined in response to weather conditions and habitat changes.

B. Population Objectives

Considerable controversy exists over herd size objectives in deer herds throughout the state. Sportsmen would certainly like to see deer herds return to the levels of the 1950s; however, current range conditions will not allow herds to expand beyond the capacity of the habitat. Accurate population estimates are critical to addressing this issue. Although the Division has improved its computer models in recent years, studies have shown that the most sensitive parameters in those models are adult doe and fawn survival (White and Bartmann 1998). Thus, a small change in either of those parameters can cause the population to increase or decrease. Increasing the accuracy of the survival data would require collecting overwinter survival estimates of adult does and fawns in several representative units statewide.

C. Predator Management

Predators are often identified as one of the main causes for mule deer herd declines in Utah. However, predator-prey relationships are complex and not always easily understood. There are often many factors which can negatively affect mule deer populations including predation. The complex relationship between predators and habitat is described by Geist (1999). "Inevitably predators are blamed for declining mule deer populations, in particular when the survival of fawns is low. There is no doubt that today's predators are effective in killing deer. However, predation is not independent of poor habitat quality. Such translates itself less as a reduced birth rate, but as fawns born too small, too poorly developed and too weak to be viable. Here predators take fawns that have a low chance of survival anyway. Improved habitat quality, which leads to better growth and larger body size in deer, is also expected to lead to large, vigorous fawns that are more difficult for predators to catch."

Mountain lions, coyotes, and, in some areas, black bears are the primary predators of mule deer in Utah (Smith 1983). Temporary reductions of predator populations can help deer populations that are well below the carrying capacity of their habitat. However, to be effective, predator management must be of sufficient intensity and duration to significantly reduce predator populations. Intensive predator management is costly, and therefore is probably not warranted on units that are near objective or where habitat is limiting population growth.

Predator management in Utah is guided by a predator management policy (Appendix 1). This policy specifies that predator management can occur on units which are performing well below population objectives providing a predator management plan is written and approved. "Triggers" have also been identified and adopted by the Wildlife Board as to when an evaluation will be conducted to determine if a predator management plan should be written.

D. Disease Issues

The impact of disease on mule deer populations in Utah is not well understood. Deer mortality studies in Utah have implicated many diseases as potentially detrimental to deer herds. Those diseases include; bluetongue, epizootic hemorrhagic disease (EHD), pneumonia, enterotoxemia (Zwank 1979, Karpowitz 1984), and others. Impacts of other diseases, such as Chronic Wasting Disease (CWD) have yet to be determined. The total impacts of disease on mule deer populations are often difficult and expensive to assess and treatment options are often impractical, impossible, or non-existent.

Surveillance and research of disease issues is an important part of proper deer management. As stated in the WAFWA (2003) publication on mule deer: "it is important that entities with management authority for mule deer make a more serious commitment to disease research. Only when large-scale die-offs occur do diseases become an important issue for wildlife management agencies. By then, it is often too late to do anything more than document the mortalities"

The recent discovery of CWD in Utah has caused great concern for Utah deer populations. CWD is known as a transmissible spongiform encephalopathy (TSE) and is a contagious, slow-acting, degenerative disease that affects members of the cervid family including white-tailed deer (*Odocoileus virginianus*), mule deer (Williams and Young 1980, Miller and Wilde 2004), Rocky mountain elk (*Cervus elaphus*) (Williams and Young 1982, Miller et al. 1998, Miller et al. 2000, Williams et al. 2002), and moose (*Alces alces*) (Kreeger et al. 2006, Baeten et al. 2007). CWD has the greatest affect on the central nervous system of an infected animal which results in weight loss, deterioration of body condition, and eventually death (Williams and Young 1980, Williams and Young 1982, Williams and Young 1992, Spraker et al. 1997, Williams et al. 2002).

Little is known regarding the exact origin of CWD and the manner of transmission, particularly in free-ranging populations, is not fully understood (Spraker et al. 1997, Miller et al. 2000, Williams and Miller 2002, Miller and Williams 2003). Current research indicates that deer-to-deer, or deer-to-environment routes including saliva, excreta, carcasses (Miller and Williams 2003, Miller et al. 2004), and contaminated soils (Johnson et al. 2007) from infected animals are potential routes of transmission. These routes may serve to preserve and amplify the CWD agent, particularly when mule deer gather on winter ranges or within groups of related does. It is believed that during seasonal congregations, mule deer could potentially receive more exposure to infectious agents where they may encounter higher densities of infected animals, their carcasses, or their excreta (Williams et al. 2002, Miller and Williams 2003, Conner and Miller 2004, Miller et al. 2004, Miller and Conner 2005, Farnsworth 2006). Whereas the spatial spread of CWD likely occurs through large-scale movements such as seasonal migration or dispersal, the transmission of the disease within populations is likely due to cohort interactions among sub-populations (Conner and Miller 2004, Miller and Conner 2005, Farnsworth 2006).

The discovery of CWD in Utah has brought about a need for better understanding of the disease. The disease was detected in three distinct geographic locations of northeastern, southeastern, and central Utah, but the source of infection remains unknown. Continued surveillance and research will be the key to better understanding the spread and movement of the disease within Utah.

Bluetongue and EHD are other common diseases that may affect mule deer in Utah. Both diseases are caused by viruses, and cattle are thought to be the primary reservoir. Epizootic outbreaks of bluetongue and EHD generally occur during late summer and early autumn, and all sex and age classes may be affected. The most important vectors for bluetongue and EHD are no-see-um gnats of the genus *Culicoides*, and die-offs can be expected to terminate shortly after temperatures drop below freezing. EHD outbreaks and losses have been documented in mule deer from southeastern Utah and near Zion National Park in the late 1990's. Although losses to these diseases can be significant, they are most often isolated events and populations generally recover quickly.

E. Access Management

The use of off highway vehicles (OHVs) in Utah has dramatically increased in recent years. OHV registrations have increased more than 3-fold from 1998 to 2006 (from 77,509 to 200,842) and more than 100 times in the past 30 years. Uncontrolled use of OHVs can cause damage to mule deer habitat and disturbance to mule deer during critical phases of their life cycle. Shed antler gathering and the associated human disturbance on crucial winter ranges, especially with the use of OHVs, can cause undue stress on mule deer during a time when they must conserve energy. Federal land management agencies are currently struggling with significant issues involving the use of OHVs on public land. Those agencies recognize OHV use as a legitimate use of public land, but also recognize the potential problems associated with uncontrolled use.

There is also an increased demand for more walk-in and horseback only access areas in the state. Many hunters want the opportunity to hunt in a remote area that has lower hunter densities and they don't have to compete with OHV traffic. Biologically, limiting areas to foot and horse travel can limit hunter pressure, reduce harvest, and increase buck:doe ratios.

F. Depredation

Depredation of private croplands continues to exist despite reductions in deer populations. In some areas depredation can be a significant problem for deer herd recovery. DWR has committed substantial resources to address depredation concerns, and there are numerous programs designed to assist landowners with depredation situations. Depredation problems need to be addressed in a timely and efficient manner so that landowners will better tolerate migratory populations of mule deer.

G. Private Land/ Cooperative Wildlife Management Unit Issues

The value of private lands to the overall deer population cannot be overstated. Many crucial mule deer habitats throughout the state are on privately owned lands. Unfortunately, some of those private rangelands have been converted from mule deer habitat to housing developments, recreational properties, or other uses. As such, programs that provide incentives to private landowners to manage their properties for mule deer and other wildlife are critical to the success of the state's deer management program. Programs like the Cooperative Wildlife Management Unit program, the private landowner permit program, and the Walk-In Access program currently provide incentives for landowners to manage for healthy habitat and deer population on their

properties. Additionally, the Utah Watershed Restoration Initiative has worked with numerous cooperating landowners to provide funding and other resources to accomplish vegetation treatments on private and public lands to benefit mule deer and other wildlife, as well as livestock.

H. Winter Feeding

Supplemental feeding is often viewed by the public as a simple solution to a lack of forage on crucial deer winter ranges especially during severe winters. However, there is abundant evidence that the potential harm created by feeding mule deer can far outweigh the limited benefits (WAFWA 2003). Winter feeding programs are generally very costly and can cause problems for mule deer including behavioral changes, range destruction, and expansion of disease problems. However, as stated in the WAFWA publication on mule deer “in very limited and extreme situations” it may be necessary to feed deer to sustain a base population. The publication warns that if a feeding program is undertaken, “be prepared to pay a hefty price for success. Supplemental feeding helps mule deer make it through a severe winter if the feeding is started early, long before mule deer show signs of malnutrition or starvation. To effectively feed mule deer requires a three to four month commitment.”

Winter feeding of mule deer in Utah is currently guided by a winter feeding policy (Appendix 2). Under this policy feeding is discouraged except under extreme circumstances. With the discovery of chronic wasting disease in Utah, the feeding policy was updated to state that “the Division will not participate in any emergency big game feeding program that occurs within the known range or use area of any big game population where chronic wasting disease, brucellosis or tuberculosis has been detected.”

I. Competition

“Competition occurs when two species use the same limited resource, and one of the two suffers in some way because of that use” (WAFWA 2003). Competition can potentially occur between deer and other ungulates such as livestock or elk. Competition most often occurs where habitat is limited such as on crucial winter ranges or on the summer ranges of some drier units.

Although elk or livestock cannot be specifically linked as the number one factor leading to the declines in mule deer populations, grazing by livestock or other ungulates can greatly impact mule deer habitat and populations (deVos, et. al. 2003). Crucial ranges where elk or livestock coexist with mule deer should be closely monitored to prevent over use and competition.

USE AND DEMAND

Mule deer are the most important game animal in Utah. Hunter demand and interest has always been high and the family tradition of mule deer hunting is strongly rooted in Utah (Figure 1). From 1960 to 1993, no fewer than 150,000 hunters participated in the annual mule deer hunt. Over 200,000 hunters participated in the deer hunt each year from 1977 to 1992, except in 1984. In 1994, hunter numbers were capped at 97,000 due to a declining deer population.

In recent years, the demand for both limited entry and general season permits has been increasing (Table 1). In 2008, the odds of drawing a limited entry buck tag were 1 in 22.5, compared to 1 in 8.3 in 1998. The odds of drawing a general season permit also increased from 1 in 1.1 in 2000 to 1 in 1.4 in 2007. Although the limited entry permits are very desirable, it is clear that many Utah hunters are also interested in being able to hunt every year. As demand for both permit types continues to increase faster than supply, many hunters are giving up on the sport. This combined with a loss of youth hunters (due largely to increasing urbanization and increasing competition with other activities) is causing a decrease in the percentage of people taking advantage of hunting (U.S. Department of the Interior 2008). The North American model of wildlife management is based on the premise that hunters are largely responsible for funding the management of game animals. If we continue to lose hunters and fail to recruit youth hunters, the current system under which we manage wildlife has failed. Thus, it is critical to the future of hunting and wildlife management in Utah to provide people with the opportunity to hunt while also providing them with a high-quality experience.

Although the statewide deer population declined in the early 2000s due to drought and reduced habitat quality, recent weather conditions have resulted in an increasing deer population (Figure 2), and in 2007 all 5 regions were meeting the minimum population objective of 15 bucks per 100 does (Table 2). Although current permit levels are below the 97,000 permit cap due to the severe weather in winter 2007–2008, permit numbers could be increased if weather patterns return to normal and habitat improvement projects are successful.

Mule deer are also a high interest watchable wildlife species. Nearly everyone enjoys seeing deer in the wild. Many thousands of hours and considerable dollars are expended each year in deer watching activities. Units that produce large bucks are especially attractive not only to hunters but wildlife watchers and photographers as well.

V. CONCLUSION

Mule deer are the most abundant big game animal in Utah and are of high interest to sportsmen and non-consumptive users. The mule deer population in Utah has been in a state of decline for over thirty years. There are many factors contributing to this decline, but the loss and degradation of habitat have likely had the most significant impact on mule deer numbers. Other factors such as predation and disease are intensified when habitat quality is reduced. If deer herds are to recover in Utah, extensive habitat work will need to be done to rehabilitate crucial mule deer ranges, and compensate for a climatic trend toward hotter and drier conditions. . It is vital that the DWR, federal agencies, sportsmen organizations, private landowners, and others work together in an effort to protect and improve mule deer habitat if we hope to maintain and expand mule deer populations to meet management goals.

VI. STATEWIDE MANAGEMENT GOALS AND OBJECTIVES

Population Management Goal: Expand and improve mule deer populations throughout the state within the carrying capacity of available habitats and in consideration of other land uses.

Population Objective 1: By 2013, increase the statewide mule deer population by 50,000 to an estimated post-season herd size of 350,000.

Implications: This objective can be accomplished if precipitation returns to normal and through the implementation of the strategies in this plan. If precipitation does not return to normal and habitat objectives are not met, it is unlikely the herd will expand beyond the current level of 302,000 deer.

Strategies:

- a. Review individual herd unit management plans and revise where necessary to provide consistency with this plan.
- b. Support all habitat objectives and strategies in this plan to protect and improve mule deer habitat including energy development mitigation in crucial mule deer habitat.
- c. Manage predators on all units that are chronically below objective, and habitat is not limiting, according to current predator management policy. (Appendix A).
- d. Investigate and manage disease outbreaks that threaten mule deer populations. Adopt a specific management plan for chronic wasting disease (CWD).
- e. Work with Federal and state land management agencies to adopt seasonal closures or travel restrictions to minimize human disturbance of wintering mule deer.
- f. Use antlerless harvest as the primary tool to manage deer populations in specific areas where range concerns or depredation problems exist.
- g. Continue to monitor all mule deer populations annually to evaluate fawn production, herd composition, and habitat use.
- h. Implement a method to collect annual adult doe and fawn mortality estimates on representative units statewide.
- i. Use standardized, reliable population models to evaluate herd size and population trends over time.
- j. Work with UDOT, Universities, local conservation groups, and landowners to minimize highway mortality by identifying locations of high deer-vehicle collisions and erecting sufficient wildlife crossing structures in those locations. Evaluate the effectiveness of the crossing structures over time and implement new technologies to improve future wildlife crossing structures.
- k. Implement research studies on specific herd units that are chronically below population objective to identify problems and recommend solutions.
- l. Support incentive programs for landowners that will encourage deer populations on private lands such as the CWMU, landowner permit, and the Walk-In Access programs.
- m. Address all depredation problems in a timely and efficient manner to increase landowner tolerance of migratory deer populations.

- n. Work with municipalities to promote zoning that benefits mule deer on winter ranges that have the potential to be developed.
- o. Support law enforcement efforts to educate the public concerning poaching and reduce illegal taking of deer.
- p. Implement emergency feeding when needed in accordance with DWR feeding policy (Appendix B).

Habitat Goal: Conserve and improve mule deer habitat throughout the state with emphasis on crucial ranges.

Habitat Objective 1: Maintain mule deer habitat throughout the state by protecting and enhancing existing crucial habitats and mitigating for losses due to natural and human impacts.

Implications: Loss of crucial mule deer habitat will need to be minimized to achieve population objectives. Mitigation is essential for loss or degradation of all crucial habitats due to human impacts.

Strategies:

- a. Continue to identify, map, and characterize crucial mule deer habitats throughout the state, and identify threats and limiting factors to each habitat.
- b. Work with land management agencies and private landowners to identify and properly manage crucial mule deer habitats, especially fawning and wintering areas.
- c. Work with county, federal and state land management agencies to adopt seasonal road closures to minimize human disturbance in existing crucial mule deer habitats.
- d. Minimize impacts and mitigate for losses of crucial habitat due to human impacts and energy development.
- e. Acquire additional crucial mule deer habitats to offset loss of habitat due to human encroachment.
- f. Work with municipalities to promote zoning that benefits mule deer on winter ranges that have the potential to be developed.
- g. Support incentive programs for landowners that will encourage deer populations on private lands such as the CWMU, landowner permit, and the Walk-In Access programs.
- h. Support the establishment of multi-agency OHV travel plans developed on a county level or planning unit level and support ongoing efforts to reduce illegal OHV use to prevent resource damage and to protect crucial mule deer habitat.
- i. Work with county, state, and federal agencies to limit the negative effects of roads by reclaiming unused roads, properly planning new roads, and installing fencing and highway passage structures where roads disrupt normal mule deer migration patterns.

Habitat Objective 2: Improve the quality and quantity of vegetation for mule deer on a minimum of 500,000 acres of crucial range by 2013.

Implications: Habitat will need to be improved on at least 500,000 acres of crucial mule deer range to meet the population objectives in this plan. If habitat improvement projects cannot be completed because of inadequate funding, environmental restrictions, or unfavorable climatic

conditions, population objectives may not be achieved. Additionally, because habitat treatments often require a number of years before they provide optimal benefits to mule deer, and if large catastrophic wildfires and energy developments continue to impact crucial mule deer ranges, the population and habitat goals of this plan may not be achieved within the 5-year life of this plan.

Strategies:

- a. Continue to support the interagency Big Game Range Trend Studies crew in monitoring the long-term trends of crucial mule deer ranges throughout the state.
- b. Work with land management agencies, conservation organizations, private landowners, and local leaders through the regional Watershed Restoration Initiative working groups to identify and prioritize mule deer habitats that are in need of enhancement or restoration (Figure 4).
- c. Initiate broad scale vegetative treatment projects to improve mule deer habitat with emphasis on drought or fire damaged sagebrush winter ranges, ranges that are being taken over by invasive annual grass species, and ranges being diminished by encroachment of conifers into sagebrush or aspen habitats.
- d. Continue to support and provide leadership for the Utah Watershed Restoration Initiative, which emphasizes improving sagebrush-steppe, aspen, and riparian habitats across all landownerships.
- e. Seek opportunities through the Watershed Restoration Initiative to improve aspen communities on summer ranges which provides crucial fawning habitat for mule deer.
- f. Encourage land managers to manage portions of pinion-juniper woodlands and aspen/conifer forests in early successional stages.
- g. Discourage the practice of winter deer feeding programs which can cause habitat degradation. Feeding of mule deer will be in accordance to DWR policy (Appendix B).
- h. Properly manage elk populations to minimize competition with mule deer on crucial ranges.
- i. Work with state and federal land management agencies to properly manage livestock to enhance crucial mule deer ranges.
- j. Continue to support the conservation permit and habitat enhancement programs which provide critical funding for habitat improvement efforts.

Recreation Goal: Provide a diversity of high-quality hunting and viewing opportunities for mule deer throughout the state.

Recreation Objective 1: Maintain a hunting program for mule deer that encourages a variety of quality hunting opportunities while maintaining population objectives.

Implications: Current hunting programs can be maintained if population objectives are met. If drought conditions occur in the next 5 years, hunting opportunity may need to be restricted.

Strategies:

- a. Continue to provide three hunt unit categories (general season, limited entry and premium limited entry) in approximately the current distribution to provide a variety of hunting opportunities.

1. Manage general season units for a 3-year average of 15–25 bucks/100 does and a 9-day long any weapon season.
 - i. If a unit/subunit in a given region falls below a 3-year average of 15 bucks/100 does, the season length for that unit/subunit will be shortened to 5 days in the following hunting season. The season length will remain shortened until the 3-year average buck:doe ratio increases to $\geq 15/100$.
 - ii. If a unit/subunit in a given region falls below a 3-year average of 10 bucks/100 does, that unit/subunit will be managed on a limited entry basis in the following hunting season. The unit/subunit will continue under limited entry management until the 3-year average buck:doe ratio $\geq 15/100$.
2. Manage limited entry units for a 3-year average of 25–35 bucks/100 does
 - i. If the buck:doe ratio exceeds 35 bucks/100 does, limited entry permits will be increased to bring the population to objective within 3 years.
3. Manage premium limited entry units for a 3-year average of 40–50 bucks/100 does and 30–40% of the harvested deer being 5 years of age or older.
 - i. Establish management buck hunts on these units to provide additional hunting opportunity
 - ii. If the 3-year average buck:doe ratio exceeds 50/100, management buck permits will be increased to bring the population back to objective within 3 years.
 - iii. If $>40\%$ of the harvested bucks (3-year average) are 5 years of age or older, premium limited entry permits will be increased by no more than 20% in any given year until the age objective is met.
- b. Provide opportunities for primitive weapon hunts to provide diverse recreational opportunities.
- c. Establish season lengths that will provide adequate hunting opportunity without negatively affecting deer population objectives.
- d. Provide hunting opportunities that will encourage youth participation and maintain family hunting traditions.
- e. Support hunting programs that will allow landowners and the public to equitably benefit from deer using private land such the CWMU, landowner permit, and Walk-In Access programs.
- f. Support the responsible use of off-highway vehicles in specified areas during hunting seasons.
- g. Promote the establishment of foot and horseback only access areas to provide a diversity of hunting opportunities

Recreation Objective 2. Increase opportunities for viewing of mule deer while educating the public concerning the needs of deer and the importance of habitat.

Implications: Increased viewing opportunities for mule deer should be accompanied by efforts to educate the public on mule deer and mule deer habitat. Education should be a component of all viewing opportunities.

Strategies:

- a. Install interpretive signs in mule deer viewing areas emphasizing the importance of habitat.

- b. Produce written guides and brochures to educate the public on how and where to view mule deer and the importance of crucial habitats.
- c. Work with the media to promote interest and educate the public concerning mule deer and their habitat needs.

DRAFT

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Table 1. Limited Entry and general season odds of obtaining a permit, Utah 1998–2008.

Permit type	Year	Resident odds	Nonresident odds	Overall Odds
Limited Entry	1998	1 in 7.5	1 in 19.7	1 in 8.3
	1999	1 in 7.9	1 in 16.3	1 in 8.5
	2000	1 in 8.9	1 in 14.4	1 in 9.3
	2001	1 in 9.9	1 in 18.1	1 in 10.6
	2002	1 in 12.8	1 in 24.8	1 in 13.8
	2003	1 in 15.2	1 in 34.0	1 in 16.7
	2004	1 in 17.2	1 in 40.4	1 in 19.1
	2005	1 in 19.5	1 in 48.3	1 in 21.7
	2006	1 in 19.9	1 in 49.7	1 in 22.1
	2007	1 in 21.0	1 in 62.2	1 in 23.7
	2008	1 in 20.6	1 in 48.2	1 in 22.5
General Season	2000	—	—	1 in 1.1
	2001	1 in 1.2	1 in 1.6	1 in 1.2
	2002	1 in 1.3	1 in 1.7	1 in 1.3
	2003	1 in 1.3	1 in 1.9	1 in 1.3
	2004	1 in 1.3	1 in 1.7	1 in 1.3
	2005	1 in 1.4	1 in 1.7	1 in 1.4
	2006	1 in 1.3	1 in 1.7	1 in 1.4
	2007	1 in 1.4	1 in 1.7	1 in 1.5
	2008	1 in 1.4	1 in 1.5	1 in 1.4

Table 2. General season public land unit buck:doe ratios and objectives, Utah 2005–2007.

Region	General Season Public Land Units	Objective	2005	2006	2007	3 Year Average
Northern	Box Elder		19	19	21	19.4
	Cache		11	14	20	15.0
	Kamas		22	22	16	20.1
	North Slope, Summit		—	—	—	—
	Average	15–20	16	18	19	17.7
Northeastern	North Slope, W Daggett / 3 Corners		17	16	19	17.5
	South Slope		14	16	14	14.5
	Nine Mile, Anthro		—	19	23	14.0
	Wasatch Mtns., Currant Creek / Avintaquin		18	17	18	17.7
	Average	15–20	16	16	17	16.2
Southeastern	Ninemile, Range Creek		24	31	30	28.4
	San Rafael		—	—	—	—
	La Sal Mountains		13	15	13	13.9
	San Juan, Abajo Mountains		19	22	23	21.2
	Central Mountains, Manti		15	15	16	15.5
	Average	15–20	17	20	19	18.7
Central	Central Mountains, Nebo		13	12	18	14.2
	Wasatch Mountains, West		19	21	18	19.3
	Oquirrh/Stansbury		13	10	11	11.4
	West Desert		15	15	22	17.5
	Average	15–20	15	15	17	15.6
Southern	Southwest Desert		15	28	30	24.2
	Fillmore, Pahvant		14	13	24	17.0
	Beaver		15	18	13	15.1
	Monroe		9	13	10	10.7
	Mount Dutton		13	19	18	16.7
	Plateau, Fishlake / Boulder		19	15	14	15.8
	Kaiparowits		—	—	—	—
	Panquitch Lake		25	15	24	21.6
	Zion		23	21	25	23.0
	Pine Valley		20	19	20	19.6
	Average	15–20	17	16	18	17.0

Table 3. General season private land unit buck:doe ratios and objectives, Utah 2005–2007.

General Season Private Land Units	Objective	2005	2006	2007	3 Year Average
Ogden	15–20	15	14	20	16.4
Morgan-South Rich	15–20	52	46	54	50.8
East Canyon	15–20	25	28	31	28.0
Chalk Creek	15–20	28	25	26	26.4

Table 4. Limited Entry unit buck:doe ratios and objectives, Utah 2005–2007.

Limited Entry Units	Objective	2005	2006	2007	3 Year Average
Cache, Crawford Mountain	25–35	22	11	13	15.3
South Slope, Diamond Mountain	25–35	31	37	32	33.2
Book Cliffs	25–35	41	37	43	40.0
La Sal, Dolores Triangle	25–35	28	17	35	26.8
San Juan, Elk Ridge	25–35	28	28	34	30.1
West Desert, Vernon	25–35	19	30	44	31.0
Fillmore, Oak Creek	25–35	31	24	15	23.3
Plateau, Thousand Lake	25–35	13	21	19	17.6

Table 5. Premium Limited Entry unit buck:doe ratios and objectives, Utah 2005–2007.

Premium Limited Entry Units		Objective	2005	2006	2007	3 Year Average
Henry Mountains	Buck:doe ratio	35+	48	37	54	46.3
	Mean age	5.0	4.9	5.2	5.5	5.2
	% > 5 years old	—	63	55	52	57
Paunsaugunt	Buck:doe ratio	35+	46	48	59	51.1
	Mean age	5.0	4.5	4.4	4.7	4.5
	% > 5 years old	—	41	43	39	41

Figure 1. Statewide trends in deer hunters afield and harvest, Utah 1925–2007.

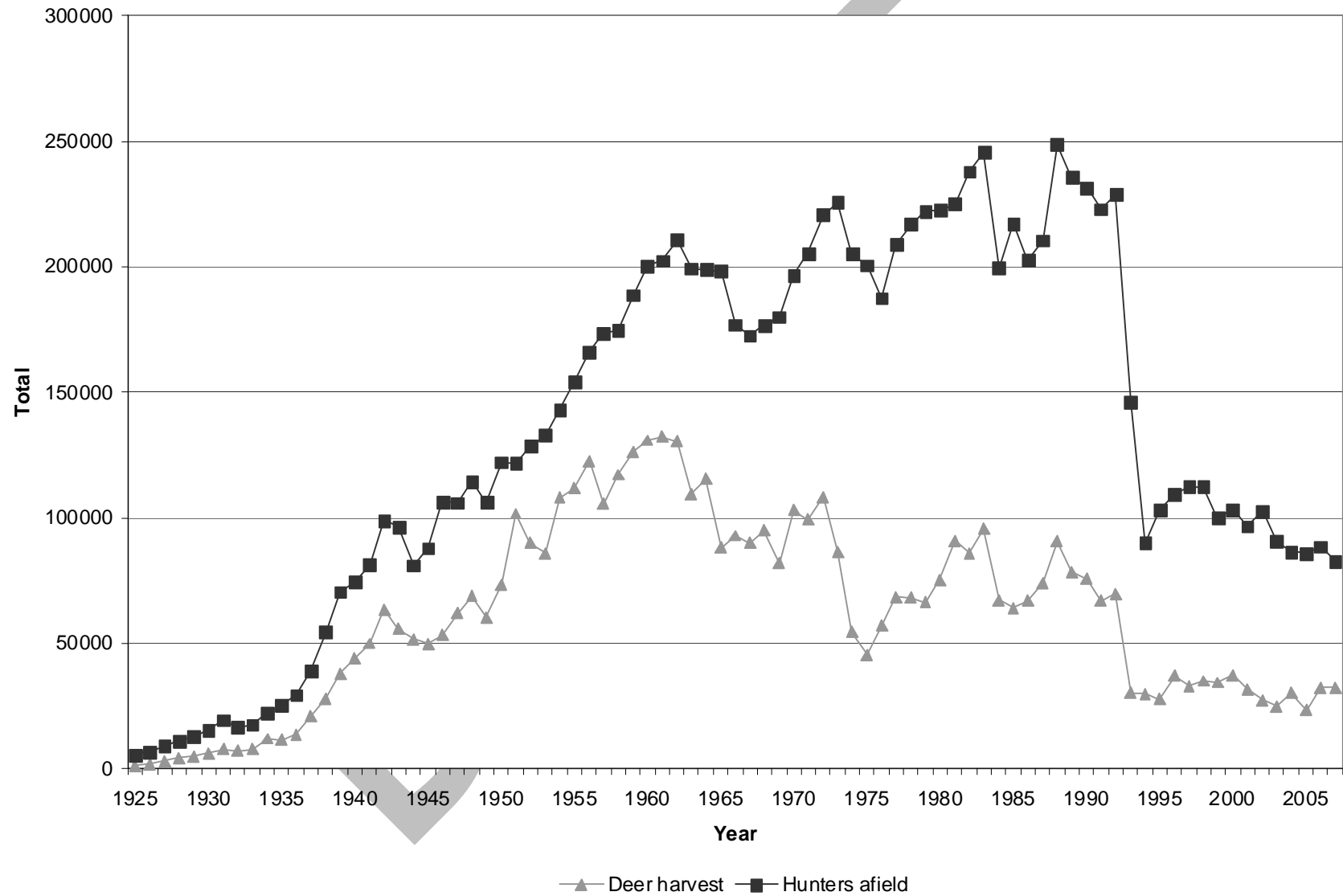


Figure 2. Statewide post-season deer population estimates, Utah 1992–2007.

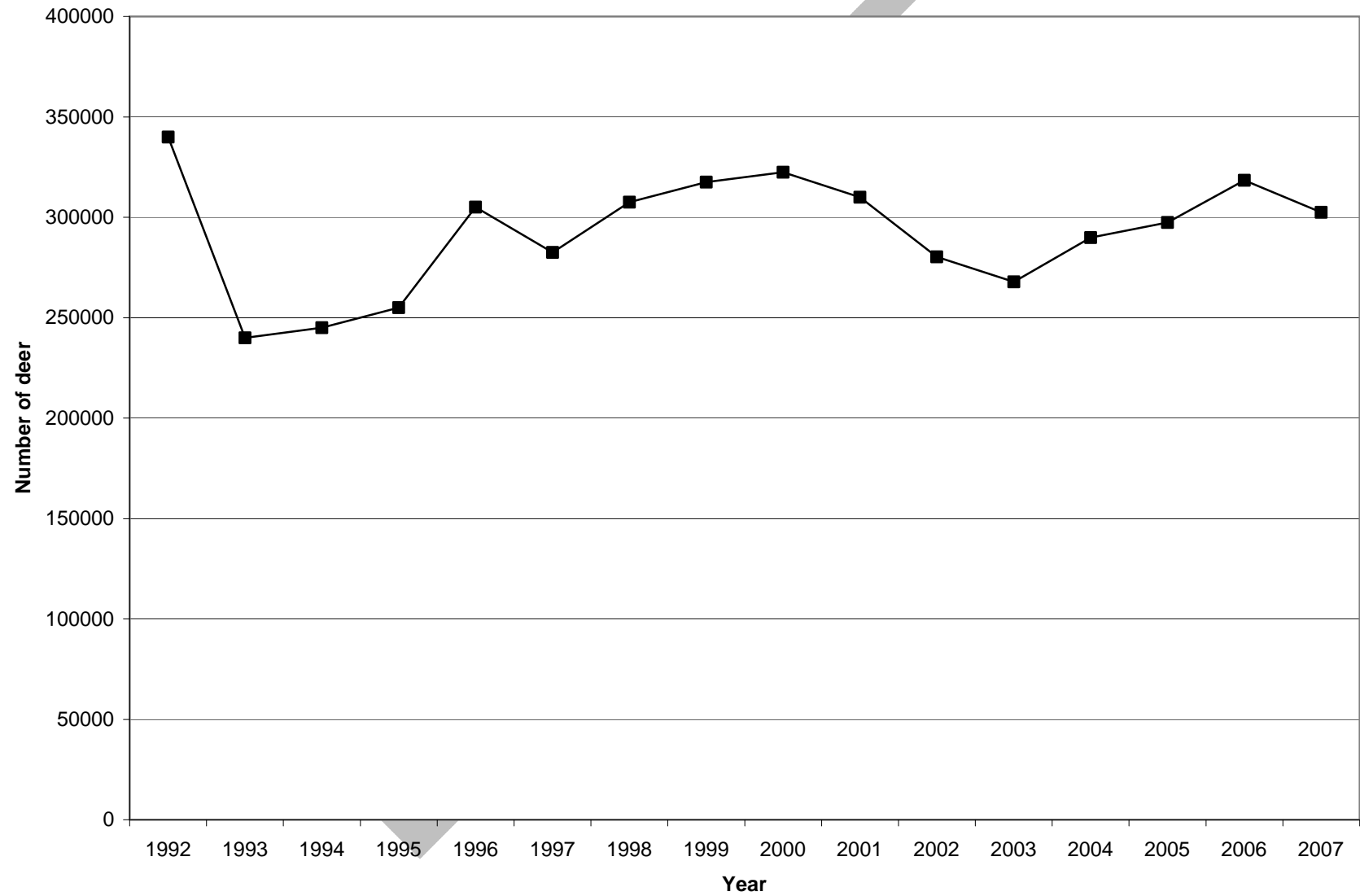


Figure 3. Mule deer habitat, Utah 2008.

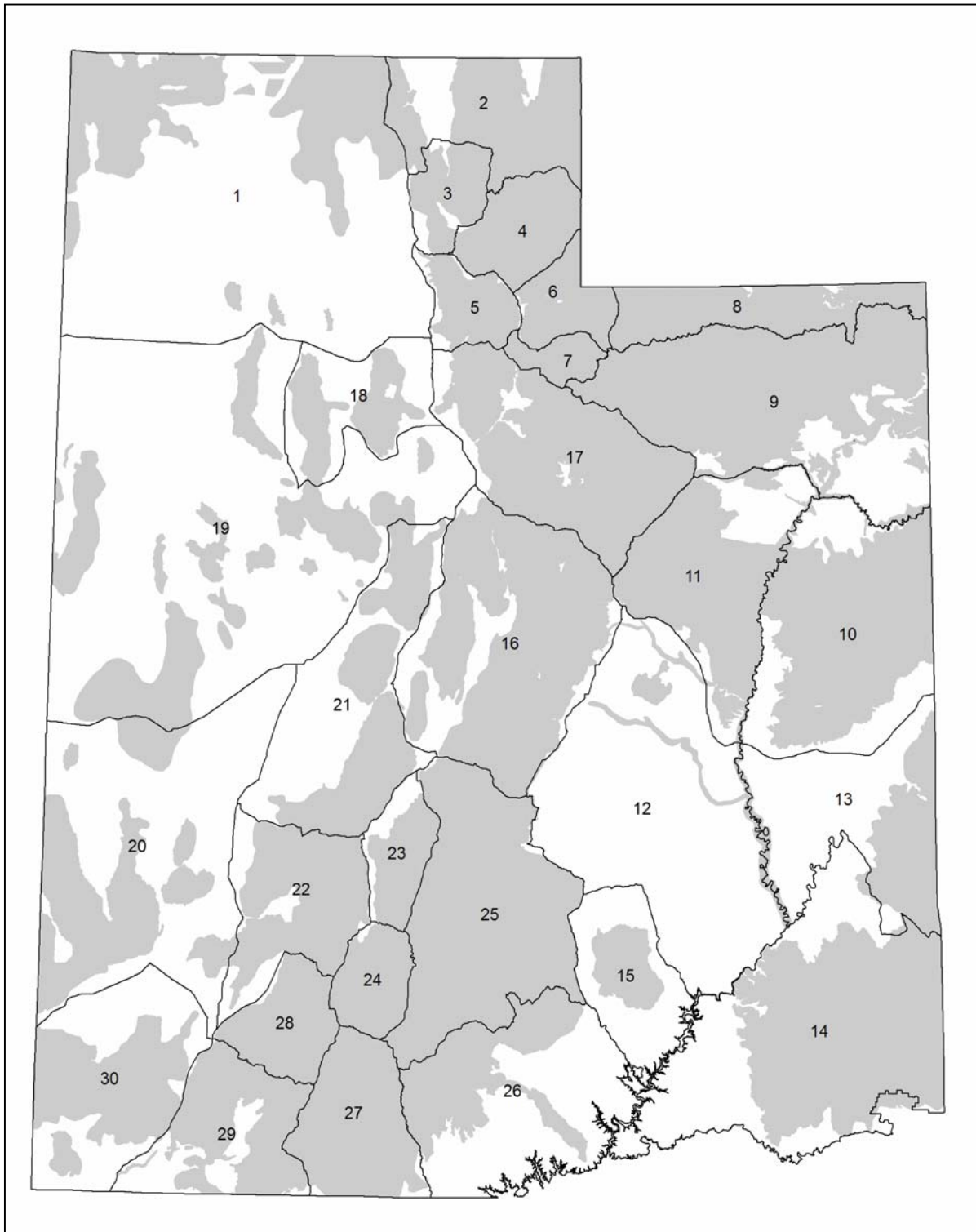


Figure 4. Crucial mule deer summer, winter, and transitional ranges located in Wildlife Action Plan focus areas, Utah 2003.

